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ABSTRACT

This unit of study provides teaching guidelines and student material intended for use in high school advanced industrial arts programs. The objective is to help students plan and purchase equipment for a home workshop. A necessary prerequisite is a knowledge of the operations and uses of the equipment involved. The material is divided into five sequential capsules. Capsule I involves the student in deciding the type of shop he or she wants and selecting the appropriate tools and equipment. Capsule II emphasizes warranties, quality, and specifications. Capsule III deals with comparison shopping. Capsule IV focuses on used equipment, while Capsule V explores methods of placing equipment in a shop space. Learning activities include answering questions, listing, analyzing needs and guarantees, identifying specifications, comparing use and cost, charting, using catalogs, identifying criteria, and measuring and mapping. The teacher's guide provides advance preparation information, keys to activities and tests, a bibliography, and copies of all worksheets and assessments. (Author/CK)

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ED190461

# SELECTING and EQUIPPING A HOME WORKSHOP

drafting
general
electrical

woods
metals

sheet metals
auto mechanics
welding

SP 012 771

## Teacher's Guide for Capsules 1–5

Written By:
Richard Sack

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# PACKAGE RESUME FORM

PUBLICATION DATE: Spring 1980

LEVEL/SUBJECT: Advanced Industrial Arts

AUTHOR: Richard Sack

TITLE: Selecting & Equipping A Home Workshop

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ABSTRACT:

This is a series of five sequential capsules that deals with planning and purchasing equipment for a home workshop. The capsules are geared toward advanced industrial arts classes. The student should know the operations and uses of the equipment involved. Much of the work maybe done at home or on the student's own time. Some of the activities require the work to be done outside of school.

The capsule titles are:

#1. Pick and Choose
#2. Before You Buy
#3. Get A Good Deal
#4. Don't Get Stung
#5. Put It There

In the first capsule, "Pick and Choose", the student will decide on the type of shop he/she wants, list the jobs he/she wants to do, list all tools required for that area and then select the appropriate tools and equipment for his/her shop.

In Capsule 2, "Before You Buy" the student will study warranties, quality, and specifications. The student will "write" specifications for the equipment selected in the first capsule. The student will figure "cost of life" tools and select specifications for comparing tools.


(continued)

"Get A Good Deal", Capsule 3, deals with comparison shopping. The student will figure a "base price" which is a retail price of the equipment. The student will then research different methods for beating this price. Upon completion of this capsule, the student will have a total package cost for his/her shop.

The fourth capsule, "Don't Get Stung", introduces the student to the idea of buying used equipment. This capsule discusses what to look for, how to decide what to buy, and some of the different methods and places to buy used equipment.

The last capsule, "Put It There", explores methods of placing equipment in a shop space. It covers finding out how much room a piece of equipment needs for proper operation.

These capsules are interrelated and build from one capsule to the next, so they should be presented as one unit of study. The last capsule may be eliminated without affecting the total concept.

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# OBJECTIVES

Upon completion of the five sequential capsules your students should be able to:

1. make a statement of the type of shop they are interested in.

2. list the equipment needed to accomplish Objective #1.

3. analyze the importance of quality and its place in purchasing equipment to meet their needs.

4. analyze guarantees to see if they meet their equipment needs.

5. identify specifications for the equipment of their choice (as listed on activity 2.3).

6. determine a "base price" for the equipment they selected.

7. identify comparison shopping strategies to get the best buy on new equipment for their shop.

8. identify and use the criteria needed for selecting used equipment.

9. identify methods of finding used equipment.

10. identify the areas needed to operate the equipment selected in activity 2.3.

11. incorporate all equipment and operating spaces into a usable work space.

# MATERIALS LIST

The following materials will be need for each student. Materials 1 & 2 will be needed in all five capsules. Materials 3 & 4 will be needed for Capsule V.

1. notebook--loose leaf
2. paper for notebook
3. 8 X 11 inch envelope
4. tape measure

PLUS

materials listed on Student Materials List

# Materials Needed for the Shop Library

| Capsule # | | |
|---|---|---|
| 1 | 1. | textbooks in different areas |
| 2 | 2. | at least 4 different equipment catalogs all of the same year |
| 3-4 | 3. | sale catalogs, circulars, specials, newspapers, etc. |
| 5 | 4. | drawing paper or light cardboard |
| 5 | 5. | architect scales |
| 5 | 6. | drawing boards |
| 1-5 | 7. | hole punch |

| Charts & Worksheets | | |
|---|---|---|
| 2 | 1. | Equipment Usage--2.2 |
| 2 | 2. | Comparing Total Use-Cost 3.1 A |
| 2 | 3. | Shorty's Blades 3.1 B |
| 2 | 4. | Warranties: "There Ought to be a Law. . . There is"<br>Federal Trade Commission<br>Legal and Public Records<br>Room 130<br>Washington, D.C. 20180 |
| 2 | 5. | Sample Specification Chart, Shorty's Saw 5.1 |
| 2-4 | 6. | Specifications-Cost 5.2 |
| 3-4 | 7. | Cost Comparison Chart 6.2 |
| 4 | 8. | Criteria for Selecting Used Equipment 8.1 |
| 4 | 9. | Buying Used Equipment 8.2 |

## SPECIAL INSTRUCTIONS & SUGGESTIONS

1. The pre-test included in this capsule is intended only to find out what the student already knows about the subject and to find out if the student shows interest in this subject area. If no interest is shown, the student need not complete the capsule. If the student should have problems at this point, you will need to help him/her choose which course of action to follow.

2. The notebook listed on page 2 of the student capsule may be any type of notebook, just so the pages may be removed and replaced. The envelope listed on the same page, may be made with heavy paper or construction paper and tape.

3. The shop library which is mentioned throughout the capsules may be anywhere in the shop. Any available corner or shelf space would be appropriate.

4. Since this capsule is intended to be used on a very individualized basis, there are no set answers or keys. You will need to base your grading scale on the items found on the following page.

SPECIAL INSTRUCTIONS & SUGGESTIONS (CON'T)

4. You may wish to take into consideration the following items when grading the student's work for this capsule:
   a. the overall ability of the student
   b. to what extent the student completed each activity
   c. the student's ability to follow directions

5. All charts that are to be found in the shop library are included the Teacher's Guides of this capsule.

## GENERAL STATEMENTS

1. All students should have a working knowledge of operations and use of the equipment.

2. Each capsule should take about 3 to 5 hours of instructional time to complete.

3. Worksheets, charts, etc. are numbered by the objective--see introduction in Capsule I.

4. It would be helpful for you, the instructor, to read all five capsules before the student begins Capsule I.

5. Answer keys are numbered by objective and activity.

# CAPSULE DIRECTIONS

A. Pick and Choose--Capsule I

1. When checking activities 1.1 and 1.2 make sure the students have a detailed statement and list of job types.

2. With activities 2.1 and 2.3, the student will have a tendency not to list enough equipment.

3. When checking the notebook, you should check each page to make sure that it is correct and in order.

4. There are no answer keys in the first capsule.

B. Before You Buy--Capsule II

1. Activity 3.1 A-- an answer sheet is needed

2. All prices and times are arbritary; they are not necessarily correct.

3. Activity 3.1 B--an answer sheet is needed.

4. Activity 4.1--an answer sheet is needed.

5. Activity 5.1--an answer sheet is needed.

6. Activity 5.2-- the student will need a number of copies of this chart.

7. Check the order of items in the notebook.

C. Get A Good Deal--Capsule III

1. Check for equal specifications in activity 6.1.

2. There are no answer keys for this capsule.

D. Don't Get Stung--Capsule IV

1. Activity 8.1-- an answer key is needed.

2. Activity 9.1 to 9.4 may be tailored to your area.

E. Put It There--Capsule V

1. The envelope can be made by the class.

2. This capsule does not work with existing walls. You may want your students to use an area of their house or garage and make the equipment fit that space.

*NOTE FOR THE INSTRUCTOR: The pre- and Post-tests are the same, therefore, we have included only this one key.

NAME KEY DATE _____

THE STUDENTS' ANSWERS SHOULD CONTAIN AT LEAST THE FOLLOWING INFORMATION.

DIRECTIONS: Use this page to answer the following questions. If you need more space, write on the back of the page.

1. You are going to buy a table saw, explain how and what you would buy.

A. WARRANTIES OR GUARANTEES

B. QUALITY

C. SPECIFICATIONS

D. USE

E. COST

2. How do you decide what to buy for a home workshop? (Do not include a list of tools)

A. JOBS WANTED DONE

B. STATEMENT OF WHAT IS WANTED

C. LIST OF TOOLS NEEDED TO COMPLETE THE JOB

3. What is a warranty and what does it do?

A. A PROMISE OF A MANUFACTURER OR SELLER TO STAND BEHIND THE PRODUCT

B. AN EXPLANATION OF HOW MUCH OF THE PRODUCT IS COVERED AND FOR HOW LONG.



C. AN EXPLANATION OF CONSEQUENTIAL DAMAGES COVERED.

PRE-TEST (CON'T)

4. Explain the use of specifications in buying equipment.

ALLOWS COMPARISON OF TOOLS OF EQUAL VALUE

5. What do you look for in buying used equipment?

A. SPECIFICATIONS

B. MANUFACTURER

C. AGE

D. CONDITION

6. List three sources for buying used equipment.

1. GARAGE SALES
2. WANT ADS
3. AUCTIONS
4. BUSINESS
5. ETC.

7. Explain how to lay out a shop.

A. MEASURE MACHINE & USE AREA

B. TRANSFER TO PAPER

C. LAY OUT AREAS OF EQUIPMENT USAGE IN SPACE GIVEN

NAME Key DATE 13

COMPARING TOTAL USE-COST 3.1 A

| INFORMATION | ITEM #1 | COST | ITEM #2 | COST |
|---|---|---|---|---|
| Base Cost | Steel Blade | 5.49 | Carbide Tip | 23.99 |
| Times Sharpened | 5 @ $2.00 | 10.00 | 5 @ $4.00 | 20.00 |
| Hours Used / blade | 4hrs x 5 = 20hrs | | 20hrs x 5 = 100hrs | |
| # of blades needed for 100 hours | | 5 | | 1 |
| Total Cost | Base cost + sharpening x # of blades | 77.45 | | 43.99 |
| | | | | |
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| TOTAL USE COST | | | | |

NAME Key DATE

# Shorty's Blades

3.1 B

1. The cost of 100 hours of operation for the steel blade is $77.45.

2. The cost of 100 hours of operation for the carbide tip blade is $43.99.

3. If we changed the total use time for the blades for 8 hours, which saw blade would be cheaper? the steel blade - $9.49 Carbide - $23.99

Name KEY Date _____

WARRANTIES 4.1

* The answers should contain the following:

1. FULL WARRANTY: (a) replacement or fix; (b) fixed within a reasonable time; (c) you will not have to do anything unreasonable to get service; (d) warranty good for total life of warranty period for anyone; (e) if it cannot be fixed you can have replacement or your money back; (f) full does not always cover the total product.

2. LIMITED WARRANTY: (a) means "Be careful, something's missing"; (b) may cover only parts, not labor; (c) may allow only a pro-rata refund or credit; (d) require you to return the product to the store for service; (e) cover only the first purchaser; (f) charge for handling; (g) etc.

3. IMPLIED WARRANTIES: (a) rights reserved by state law, not by the company; (b) warranty of merchantability; (c) warranty of fitness for a particular purpose; (d) implied warranties come automatically with every sale.

4. CONSEQUENTIAL DAMAGES: (a) pays not only for the product, but also for damage resulting from that defective product; (c) injuries caused by defective product can usually have money damages from company.

5. If the problem is not solved:
   (a) Contact correct person in the company, do not stop with the seller.
   (b) Contact local consumer protection office.
   (c) Check with local consumer organization. (Not available in all areas.)
   (d) Small claims court, if amount is small.
   (e) If manufactured after July 4, 1975, you can sue under the Warranty Act.
   (f) Report violations of the law to the Federal Trade Commission.

NAME KEY DATE

SAMPLE SPECIFICATION CHART

5.1

SHORTY'S SAWS

| TOOLS | table size | table size with extensions (if incl.) | 90° depth of cut | 45° depth of cut | motor size-hp | motor rpm | stand | cut to front of table | table construction | guarantee | cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 inch Homecraft Saw | 22 x 17 | 22 x 32 | $3\frac{1}{4}$ | $2\frac{1}{8}$ | $2\frac{1}{2}$ | 5000 | No 45.99 | 11 3/4 at 1 in. | steel sheet metal | yes | 269.99 |
| 10 inch Contractor's Saw | 27 x 22 | 27 x 40 | $3\frac{1}{8}$ | $2\frac{1}{8}$ | 3 | 3450 | Yes | 16 | cast iron | yes | 569.98 |

1. Which saw is the sturdiest built? Contractor's Why? Cast iron table, heavier weight , size

2. Which saw is more powerful? Contractor's Why? ½ bigger hp, slower RPM

3. How would the table size affect use? On Contractor's saw would be able to cut bigger material; Homecraft-smaller area

4. Which saw would probably stand up best under heavy use? Contractor's saw Why? Motor size & RPM, table construction, weight

NAME KEY DATE

CRITERIA FOR SELECTING

USED EQUIPMENT

8.1

Explain why the following factors are important.

1. Specifications: 1. Know what the equipment is and how it is made.

2. Compare tools of equal value.

2. Manufacturer: 1. Whether or not the company is still in business, in case you need replacement parts. 2. Known company for replacement parts.

3. Age: 1. wear 2. replacement parts

4. Condition: 1. wear 2. misuse

# APPENDIX

This appendix contains copies of all worksheets and assessments. These copies may be used to make your own classroom quantity copies. To use, unstaple the sides of the teacher's guide and remove the worksheet and assessment pages. Restaple the remaining pages of the teacher's guide.

NAME _____ DATE _____

PRE-TEST

DIRECTIONS: Use this page to answer the following questions. If you need more space, write on the back of the page.

1. You are going to buy a table saw, explain how and what you would buy.

_____

_____

_____

_____

_____

_____

_____

_____

2. How do you decide what to buy for a home workshop? (Do not include a list of tools)

_____

_____

_____

_____

_____

3. What is a warranty and what does it do?

_____

_____

_____

_____

_____

PRE-TEST (CON'T)

4. Explain the use of specifications in buying equipment.

_____

_____

_____

_____

_____

_____

5. What do you look for in buying used equipment?

_____

_____

_____

_____

_____

6. List three sources for buying used equipment.

1. _____
2. _____
3. _____

7. Explain how to lay out a shop.

_____

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_____

_____

NAME _____ DATE _____

POST-TEST

DIRECTIONS: Use this page to answer the following questions. If you need more space, write on the back of the page.

1. You are going to buy a table saw, explain how and what you would buy.

_____

_____

_____

_____

_____

_____

_____

_____

2. How do you decide what to buy for a home workshop? (Do not include a list of tools)

_____

_____

_____

_____

_____

3. What is a warranty and what does it do?

_____

_____

_____

_____

_____

POST-TEST (CON'T)

4. Explain the use of specifications in buying equipment.

_____

_____

_____

_____

_____

_____

5. What do you look for in buying used equipment?

_____

_____

_____

_____

_____

6. List three sources for buying used equipment.

1. _____

2. _____

3. _____

7. Explain how to lay out a shop.

_____

_____

_____

_____

_____

_____

_____

EQUIPMENT USAGE - 2.2

JOBS - 1.1

23

EQUIPMENT - 2.1

NAME _____ DATE _____

COMPARING TOTAL USE-COST 3.1 A

| INFORMATION | ITEM #1 | COST | ITEM #2 | COST |
|---|---|---|---|---|
| | | | | |
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| TOTAL USE COST | | | | |

NAME _____ DATE _____

# Shorty's Blades

3.1 B

1. The cost of 100 hours of operation for the steel blade is _____.

2. The cost of 100 hours of operation for the carbide tip blade is _____.

3. If we changed the total use time for the blades for 8 hours, which saw blade would be cheaper? _____.

Name _____ Date _____

WARRANTIES

4.1

Define the following:

1. FULL WARRANTY: _____

2. LIMITED WARRANTY: _____

3. IMPLIED WARRANTY: _____

4. CONSEQUENTIAL DAMAGES: _____

5. Explain what to do if you have trouble getting the problem solved.

NAME _____ DATE _____

SAMPLE SPECIFICATION CHART

5.1

SHORTY'S SAWS

| TOOLS | table size | table size with extensions (if incl.) | 90° depth of cut | 45° depth of cut | motor size-hp | motor rpm | stand | cut to front of table | table construction | guarantee | cost | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 inch Homecraft Saw | | | | | | | | | | | | |
| 10 inch Contractor's Saw | | | | | | | | | | | | |

1. Which saw is the sturdiest built? _____ Why? _____

_____

2. Which saw is more powerful? _____ Why? _____

_____

3. How would the table size affect use? _____

_____

4. Which saw would probably stand up best under heavy use? _____

_____ Why? _____

_____

# SPECIFICATIONS - COST 5·2

| EQUIPMENT | SUPPLIER | SPECIFICATION | | | | | | | | | | | | GUARANTEE | LIST PRICE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | |
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| EQUIPMENT | SUPPLIER | SPECIFICATION | | | | | | | | | | | | | |
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| EQUIPMENT | SUPPLIER | SPECIFICATION | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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NAME _____

# COST COMPARISON 6·2

| EQUIPMENT | SUPPLIERS | RETAIL | | | | BASE PRICE | SALE | | | | FINAL PRICE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
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NAME _____

BASE PRICE TOTAL _____

SALE PRICE TOTAL _____

DOLLARS DIFFERENT _____

% SAVED _____

NAME _____ DATE _____

CRITERIA FOR SELECTING

USED EQUIPMENT

8.1

Explain why the following factors are important.

1. Specifications: _____

_____

_____

2. Manufacturer: _____

_____

_____

3. Age: _____

_____

_____

4. Condition: _____

_____

_____

# BUYING USED EQUIPMENT 8-2

| ITEM | Best Price | Manufacturer & In Business? | good fair poor Condition | Age If Known | yes no Specifications Match | Approximate Items Needing Repairs | Asking Price | Selling Price |
|---|---|---|---|---|---|---|---|---|
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# BUYING USED EQUIPMENT 9-1

| ITEM | Best Price | Manufacturer & In Business? | good fair poor Condition | Age If Known | yes no Specifications Match | Approximate Items Needing Repairs | Asking Price | Selling Price |
|---|---|---|---|---|---|---|---|---|
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# SELECTING and EQUIPPING A HOME WORKSHOP

Student Material's

drafting

general

electrical

woods

metals

sheet metals

auto mechanics

welding

## #1

## PICK and CHOOSE

Written By:
Richard Sack

# INTRODUCTION TO
# SELECTING AND EQUIPPING A HOME WORKSHOP

This capsule is the first of a series of capsules designed so that you will be able to know your wants and needs in selecting and equipping your personal home workshop. Due to the expense involved in purchasing equipment for a workshop, you need to become aware of your role as a consumer. The following capsules will help you become a knowledgeable consumer. You will be learning the different methods of purchasing and selecting equipment, so that you may become a more effective consumer. To accomplish this you will be introduced to a number of helpers that will help you work through this series. The first introduction is to Mr. Short Sighted. Mr. Sighted thinks he wants a complete wood shop, with every type of machine and hand tool made for woodworking, but he is wrong, as you will see later on. Shorty will be around to give demonstrations in both the right and the wrong way of doing things.

Another helper will be a light bulb with a number in it. This will indicate all objectives, and it's number will be the objective number that is listed at the beginning of each capsule. It will help you find the objective you are working on and will appear in the left margin of the paper. All objectives for all capsules will be numbered in order.

When you see this , you will know that you will have a job to do. This will indicate all required activities. If the hammer is standing up, it will indicate an activity you may do as extra credit. All activities will have two numbers. For example, with the number 1.1, the first number is the objective and the second number is the activity under that objective. So number 1.1 means the first activity under the first objective. Number 2.3 means the third activity under the second objective.

Here is a list of things you will need to bring before you start this study:

1. a three ring notebook
2. notebook paper
3. an 8 by 11 inch envelope to fit in the notebook
4. a tape measure, at least 10 feet long

With this material you are ready to begin!

GOOD LUCK

# SOMETHING TO THINK ABOUT

## PICK AND CHOOSE

Answer these questions on a separate sheet of paper and hand it in to your teacher.

1. Are you interested in having a home workshop?

2. Explain how to select equipment for a home workshop.

3. Explain how to find out how much room you will need for a home workshop.

4. Explain how to select equipment by size and quality for home workshop use.

If you answered "no" to the first question, talk to your instructor. You will probably work on some other project. However if you answered the first question "yes" but had a little trouble answering the rest of the questions, then you are ready to turn to the next page and begin work.

If you answered the first question "yes" and then were able to explain all the steps in selecting equipment, designing room and placement of equipment, and selecting equipment by size and quality, talk to your instructor and you will probably work on another project.

Get the pre-test from your teacher.

# OBJECTIVES

## PICK AND CHOOSE

Upon completion of this capsule you will be able to:

1. Make a statement of the type of shop you are interested in.
2. List the equipment needed to accomplish objective number one.

# PICK AND CHOOSE

We should wake up Shorty. He thinks he does not need this part because he already knows what equipment and what type of shop he wants. He wants to get directly into the capsule on selecting and purchasing equipment. However, Shorty is wrong, because the equipment he will need will depend upon the first objective. The first is also the most crucial, because everything from here on is based upon the statement of the type of shop in which you are interested. To accomplish this goal, you will need to do both of the following activities.

1.1 On a sheet of paper from your notebook, list all of the things you want to be able to do in your shop. Mr. Sighted's list might look like this:

1. Repair furniture
2. Refinish furniture
3. Build miniature furniture
4. Make wall plaques
5. Make planters
6. Make toys

Place your list in your notebook, and go on to the next activity.

1.2 Using the list of jobs from activity 1.1, write a statement of the type of shop you want. Shorty's statement could be: "I would like to have a woodworking shop where I could build small projects to sell and where I could repair and refinish furniture."

REMEMBER!!! This statement will be used in all future capsules, so make sure it states what you want to do.

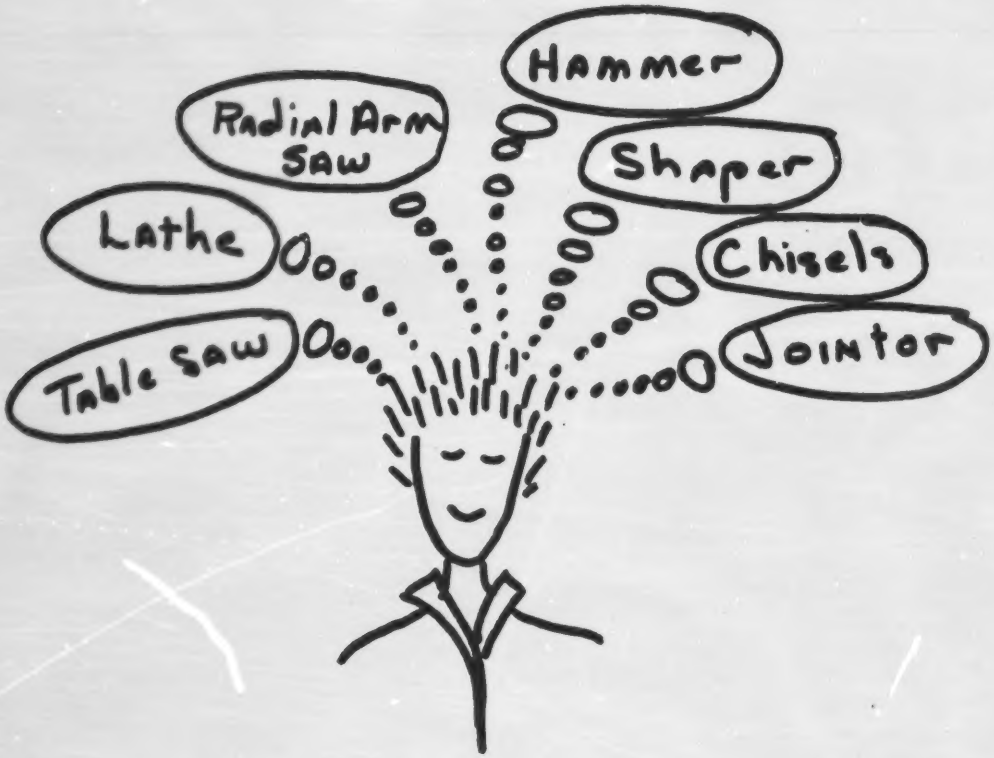
After writing your statement, copy it onto the first page of your notebook. This along with your name will be the first page in your notebook.

Upon the completion of these two activities, show your work to your instructor. If your work is O.K., you may continue. If not, rework those areas that are not satisfactory.

## VERY GOOD

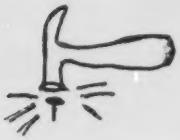
You have completed the first section. Take a Break, get a drink and then start on the next section.

Now that you know what type of shop you want, and know the types of jobs you want to do, you must select the equipment you will need to do these jobs.



Shorty has been day dreaming. He is thinking of the equipment that he thinks he wants. How does he decide what he needs? That is his problem and yours. For the answer to this, you will now work on objective number two. You are to list the equipment needed for your shop. To do this, you will need to do the next three activities.

2.1 In this activity, using a textbook in the area(s) you have selected, list all equipment needed for your workshop. REMEMBER!!! Include both power tools and handtools in your list. Then place this list in your notebook.



2.2 Now using the equipment list from activity 2.1 and the job list from activity 1.1, fill in the chart "Equipment Usage". The chart is in folder number one in the shop library. Use as many sheets as needed to include all equipment and jobs.

Mr. Sighted has begun to fill out his chart.

| EQUIPMENT USAGE 2.2 / EQUIP 2.1 | Jobs 1.1 | Repair | Refinish | Sman | Wall Magnet | Toys | | |
|---|---|---|---|---|---|---|---|---|
| Table saw | X | | X | X | X | | | |
| Rad. Arm Saw | | | X | X | X | | | |
| Chisel set | X | X | | | X | | | |
| Drill press | | | | X | X | | | |
| Plane | | | X | X | X | | | |
| Scraper | | X | X | X | | | | |
| Workbench | X | X | X | X | X | | | |
| Clamps | X | | | | | | | |

(2.2 cont.)

After the chart is filled in, check the tools needed to accomplish each job. If you have questions about the usage of a tool, use the textbook from which you got the list of equipment to find the answer. After completion of the chart, place it in your notebook. Now go on to the next activity.

2.3 In this activity you must analyze your equipment needs. Using the chart from activity 2.2, you must decide which equipment you will need to complete the most jobs. Just because a tool is listed only one or two times does not necessarily mean you will need that tool. Check to see if that job can be done with another tool. The results of this activity will be used in directing the rest of this study.

When you have completed this activity, make a final list of the equipment and place it in your notebook. Title this page "Required Shop Equipment".

# !!!!CONGRATULATIONS!!!!

You have just completed your first capsule. At this point you should have the following items, in order, in your notebook:

1. The statement of the type of shop you want. (Act. 1.2)
2. The list of jobs you want to do. (Act. 1.1)
3. The list of all equipment used in your area. (Act. 2.1)
4. The chart "Equipment Usage". (Act. 2.2)
5. Required Shop Equipment. (Act. 2.3)

At this point you must have the instructor check your notebook. If you receive the go ahead, you may begin capsule number two, "Before You Buy".

"ON TO TWO"

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# SELECTING and EQUIPPING A HOME WORKSHOP

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welding

# #2

# BEFORE YOU BUY

Written By:
Richard Sack

CAPSULE 2 "BEFORE YOU BUY"

Before you begin this capsule, Shorty would like to review a few things with you. The first is to remember that the objectives are numbered in order through all capsules. For example, in the first capsule, the objectives were numbered 1 and 2, and in this capsule the objectives will be numbered 3, 4, and 5.

Also, each objective is identified by a light bulb with a number in it. This will be in the left hand column. The second thing you will need to remember is the hammers. An upright hammer means an activity you may choose to do, but a hammer striking a nail means an activity that you must do.

With these in mind, let's begin Capsule #2, "Before You Buy"!!!

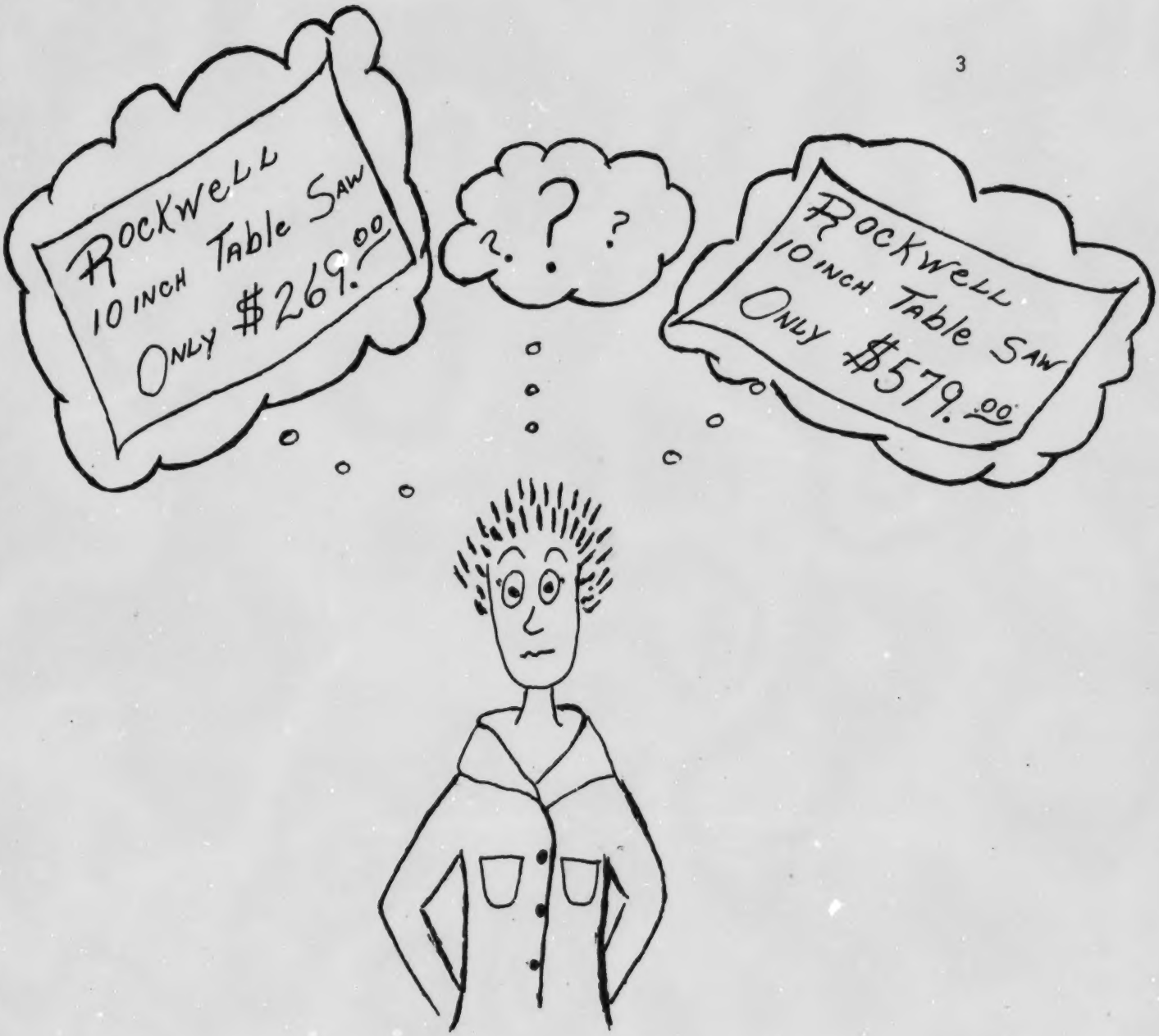
## OBJECTIVES

Upon completion of this capsule, you will be able to:

3. analyze the importance of quality and its place in purchasing equipment to meet your needs.

4. analyze guarantees to see if they meet your equipment needs.

5. identify specifications for the equipment of your choice (as listed on Activity 2.3).




What's in a price?

In the first capsule you identified the equipment you will need for your home workshop. Before you begin buying that equipment, you will need to know what you want and need. In the sketch of Shorty on the previous page, you can see that he is faced with a problem. He has apparently found two identical saws, in the same catalog*, from the same manufacturer, both 10 inch table saws, and yet one costs about twice as much as the other. This capsule will cover some of the reasons for this difference in price. You will be studying quality, guarantees, and specifications.

We will begin with quality. In this capsule we will consider quality to mean how well a piece of equipment is made, how well it works and how long it should be expected to last.

When talking about quality, a good "rule of thumb" to follow is: the better the quality, the more expensive the item will be. However this is not always the case. If all specifications and guarantees are equal and the workmanship is equal, then the most expensive may not be better.

Along with quality, you will also want to consider the number of times you will use a piece of equipment. Let's turn the page and look at one of Shorty's "problems".

---

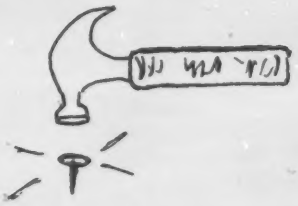
* Information and prices in this capsule are from the 1979 J. C. Penney Spring & Summer catalog.

SHORTY'S PROBLEM

When Shorty buys his table saw, he will also buy a saw blade. As you can see, Shorty has a combination steel blade and a carbide tipped blade. The question is " Which is the best buy?"

Let's compare these two blades by doing the following activity.

3.1 In this activity fill in the chart "Comparing Total Use-Cost" - 3.1 A, which is found on the shop library. Use the following information to fill in the chart. The base cost for a 10 inch steel combination blade is $5.49, and it may be sharpened five times. The blade may be used continuously for four hours before it must be sharpened. It costs $2.00 to get it sharpened each time.



The base price of a combination carbide tipped 10 inch blade is $23.99, and it may be sharpened five times. The blade may be used continuously for 20 hours before it needs sharpening. It costs $4.00 to get it sharpened each time. Both blades will need to be replaced after the fifth sharpening and use.*

*all times and costs are approximations

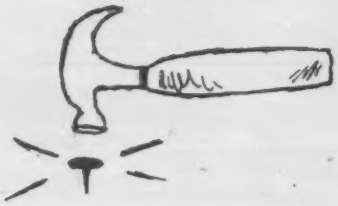
In this activity we want to find the cost of operation of the blades over 100 hours of use. In the column under "Information" you should list those things that deal with the blade, such as, the cost, number of times sharpened, cost of sharpening, etc. Under "Item", put in the equipment being compared, the number of times & hours used, etc. Fill in the rest of the chart. Shorty has started his as shown below.

Comparing Total Use-Cost 3.1

| | Item #1 | Cost | Item #2 | Cost |
|---|---|---|---|---|
| Information | Steel Blade | | Carbide Tipped | |
| Base Cost | | 5.49 | | 23.99 |
| Times Sharpened | 5 times @ 2.00 | 10.00 | | |
| Hours Used/Blade | | | | |
| Number of blades needed over 100hrs. | | | | |

Continue filling out the chart from where Shorty stopped. On the worksheet, 3.1 B "Shorty's Blades", answer the questions asked.

Upon completion of this activity, check your answers with your instructor, enter the worksheet in your notebook and go on to the next activity.



3.2

On the worksheet containing the list of your equipment from activity 2.3, write after each tool one of the following:

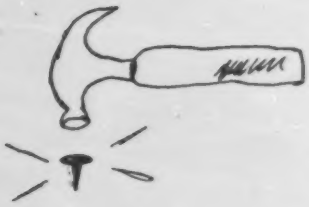
Heavy Use
Medium Use
Little Use

This will help you decide on the quality of equipment you will need. You may now go to the next section.

You are off and running!!!

Objective number 4 deals with guarantees and warranties. Guarantees vary from one company to another. You should always know what a guarantee covers and how long it lasts. Some tools may be guaranteed for 30 days while others are guaranteed for life. With this thought in mind, do the next activity.

4.1



Read "Warranties: There Ought to be a Law. . . There is". You will find this in the shop library. After reading this government pamphlet, fill out the worksheet "Warranties". It can be found in the shop library. Complete it and enter the worksheet in your notebook, then go on to the next section.

The fifth objective involves writing specifications for the equipment you have selected. The definition of "Specifications" we will use is: "A detailed and precise presentation or description of a tool or piece of equipment".

(Con't)

For example let's take a look at the table saw mentioned at the beginning of this capsule. The following information is is taken directly from the Penney's Catalog.

10 inch Homecraft (Rockwell) saw double locking rip fence. Table is steel & measures 22 X 17 inches with two 7½ X 22 inch extension wings (incl.) you get 22 X 32 inch work surface. Table surface in front of blade is 11 3/4 inch at 1 inch cutting depth. Cutting Capacity: max. depth of cut is 3 ¼ inches deep @ 90°, 2 1/8 inch deep @ 45°. Motor: develops maximum 2½ hp., overload protected. 5000 rpm (no load speed) UL listed.

A 842-1596 A -(N). Wt. 90 lbs. ———————————— $269.99

A 842-0531 A Steel Stand 22½ X 16½ X 24 inches high Wt. 26 lbs ——— $45.99

10 inch Contractor's (Rockwell) saw--Double-locking rip fence lets you rip 24 inches left or right of blade. Cutting Capacity: max depth of cut is 3 1/8 inch deep @ 90°, 2 1/8 inch deep @ 45°. Table features: cast-iron construction, measures 27 X 22 inch with 9 inch extension wings (incl.) you get big 27 X 40 inch work surface. Table surface in front of blade measures 16 inches at 1 inch cutting depth. Motor: (not included)--order below.

A 842-0226 A - Includes: steel stand- 2 extension wings (N). Wt. 1-7 lbs. ——————— $419.99.

Motor for above--develops maximum 3 hp ball bearing capacitor start 3450 rpm (no load speed) Overload button--13 amps 60 hz 1150 ac. UL listed.

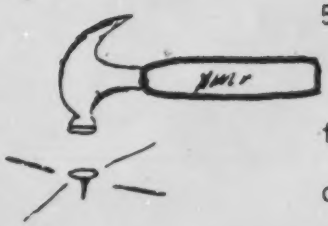
A 952-6195 -(M) Wt. 42 lbs. ———————————— $159.99

As you can see, the specifications are not the same for these two saws, even though the nominal size of the saws are the same. The problem then is which saw is best? That is a hard question to answer. We have to go back to what Shorty wants to do with his saw. In Shorty's statement in 1.2, he says he wants to build small objects. Because of this, he will not need to have the more powerful and bigger saw. However, if he wanted to build houses, he would need the bigger saw.

!! REMEMBER !!

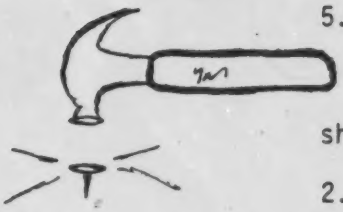
Specifications will let you identify descriptions of equipment so that you will be able to compare equal value tools and equipment!

DO THE FOLLOWING ACTIVITIES:



5.1

In this activity we are using the information Shorty found on the two table saws in the 5th objective of this capsule. Using the "Sample Specification Chart--Shorty's Saws", found in the shop library, finish filling in the specifications that are blank. List the important items across the top, fill in the information required under tools. Upon completion of this activity check your answers with the instructor, then enter the worksheet in your notebook and go on to the next activity.



5.2

Using the chart "Specifications -- Cost" found in the shop library, take your list of tools and equipment from 2.3 and fill in one supplier position for each tool. At this point you will need to decide what sizes of equipment you want and need. Be sure to include <u>all</u> specifications so that later on you will be able to compare different manufacturers' equipment. When you have completed this activity, show your work to your instructor.

# CONGRATULATIONS

You have just completed your second capsule. At this point you should have the following items, in order, in your notebook:

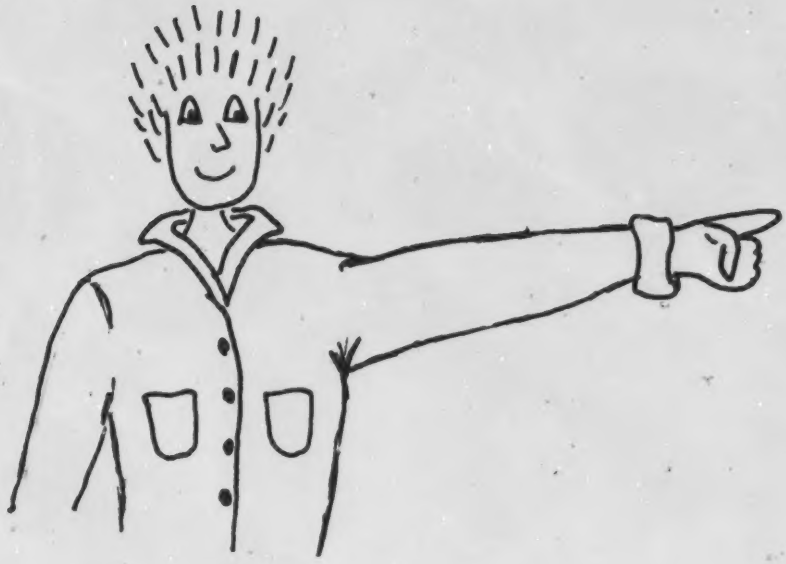
CAPSULE I

1. The statement of the type of shop you want. (activity 1.2)
2. The list of jobs you want to do. (activity 1.1)
3. The list of all equipment used in your area. (activity 2.1)
4. The chart "Equipment Usage". (activity 2.2)
5. Required Shop Equipment. (activity 2.3)

CAPSULE II

6. Comparing Total Use-Cost. (activity 3.1)
7. Warranties (activity 4.1)
8. Sample Specification Chart (activity 5.1)
9. Specifications-Cost (activity 5.2)

At this point you must have the instructor check your notebook. If you receive the go ahead, you may begin capsule number three, "Get a Good Deal".



ON TO CAPSULE 3

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# SELECTING and EQUIPPING A HOME WORKSHOP

drafting

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woods

metals

sheet metals

auto mechanics

welding

#3

## GET A GOOD DEAL

Written By:
Richard Sack

GET A GOOD DEAL!

As you begin this capsule, let's review a few things. Remember, the objectives are numbered in order through all capsules. The light bulb will inidcate the objectives, and the hammer will indicate the activities you will be doing. You are now ready to start capsule number three. Good Luck!!!

OBJECTIVES

Upon completion of this capsule, you will be able to:

6. determine a "base price" for the equipment you selected.

7. identify comparison shopping strategies to get the best buy on new equipment for your shop.

Poor Shorty, he has just had a rude awakening or we might say a "Shock in the Tools", and now he is "out like a light". He has just completed his third capsule and found out what his equipment is going to cost.

Once you have decided on the equipment you need through doing activity 5.2, you may begin to purchase that equipment. But first you need to know roughly how much your equipment is going to cost. There are a number of ways to buy tools, but this capsule will only be exploring the ways of buying new equipment.

As you begin this capsule, your first objective is to find a "base price". "Base Price" in our work will mean the lowest retail price you can find for a piece of equipment. To accomplish this, you will need to do the following activities.

6.1

Using the "Specification-Cost" chart that you began in activity 5.2, fill in at least three more supplier's equipment. Remember to fill in all specifications, and also note the catalog date. Do not use a 1979 catalog for one supplier and a 1980 catalog for another. At this point DO NOT use sale prices.

IMPORTANT

1. List all specifications given.
2. Use catalogs with the same date.
3. Do NOT use sale prices.

When you complete this activity, go on to the next one.

6.2

Use the "Cost Comparison Chart" (6.2) found in the shop library, and fill in the list of equipment from activity 2.3. Then write in the suppliers that you used from 6.1. Next list the price of each piece of equipment as on the "Specification-Cost Chart" (5.2). Shorty has started filling in his chart.

## COST COMPARISON 6·2

| EQUIPMENT | SUPPLIERS | RETAIL | | | | | SALE | | | | FINAL PRICE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Penney's 80 | Wards 80 | Sears 80 | Broadway G. 80 | BASE PRICE | | | | | |
| Table Saw 10" | | 269 | 239 | 302 | 289 | $239.00 | | | | | |
| Jointer 6" | | 325 | 299 | 279 | 380 | $279.00 | | | | | |
| | | | | | | | | | | | |

The base price (the lowest retail price) is then put in the column under "Base Price". Total this column and you will have the total retail price of your shop.

IMPORTANT

1. List all equipment from your list. (2.3)
2. Fill in all suppliers from activity 5.2.
3. Fill in all retail prices from activity 5.2.

After you have completed this activity, go on to the next one!!!

Your next objective is to beat this "total list price". In this section you will compare sale prices to the list prices of the equipment you have selected. To help you do this, do activity 7.1 and 7.2.

7.1

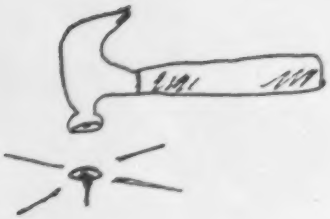
In this activity you will continue working with the "Cost Comparison Chart", 6.2. You will be filling in the spaces for sale items. These prices can come from sale catalogs, newspaper or magazine ads, quoted prices, floor demonstrators in stores, or any other place you can find prices on NEW equipment.

REMEMBER. . .

Be sure to indicate where you get the special prices, and make sure the sale item has the same specifications as your retail item has!!!!!!

Fill in as many spaces as you can find. Some items may not be sale, but the store price may be lower than a catalog price, so be sure to check. This is an important step in shopping, and you could save hundreds of dollars, so shop around.

When you have found all the sale and special prices you can find, go to the next activity.



7.2

Using the "Cost Comparison Chart" 6.2 you can now fill in the column marked "Final Price". In this column fill in the lowest price found for each item. The sale price may not be the lowest price. For example, in Shorty's chart, under "table saw", the lowest figure is $239.00. That is the price he put in the "Final Price" column. After you have determined the final price for each tool, total the column called "Final Price". By comparing the totals from your "Base Price" column and your "Final Price" column, you will be able to find how successful you are. The more money you save, the more successful you are.

## COST COMPARISON 6·2

| EQUIPMENT | SUPPLIERS | RETAIL Penney's 80 | Wards 80 | Sears 80 | Broadway G. 80 | BASE PRICE | SALE Penney's | Sears | | | FINAL PRICE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Table Saw 10" | | 269 | 239 | 302 | 281 | $237.00 | $249 | $255 | | | $239.00 |
| Jointer 6" | | 325 | 299 | 279 | 380 | $279.00 | | | | | |
| | | | | | | | | | | | |

# CONGRATULATIONS

You have just completed your third capsule. At this point you should have the following items, in order, in your notebook:

CAPSULE I

1. The statement of the type of shop you want. (activity 1.2)
2. The list of jobs you want to do. (activity 1.1)
3. The list of all equipment used in your area. (activity 2.1)
4. The chart "Equipment & Usage". (activity 2.2)
5. Required Shop Equipment (activity 2.3)

CAPSULE II

6. Comparing Total Use-Cost (activity 3.1)
7. Warranties (activity 4.1)
8. Sample specification Chart (activity 5.1)
9. Specification-Cost (activity 5.2)

CAPSULE III

10. Cost Comparison Chart (activity 6.2)

Congratulations!! You have completed the third capsule. Are you satisfied? Would you like to save even more? If you would . . . . . .

. . .Then on to Capsule 4 ⇒

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# SELECTING and EQUIPPING A HOME WORKSHOP

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## #4

## DON'T GET STUNG

Written By:

Richard Sack

As you begin this capsule, remember that the objectives are numbered in order through all capsules, and are in light bulbs in the left hand margin of the page. The hammers indicate activities to do. You may now begin the fourth capsule. Good Luck!

## OBJECTIVES

Upon completion of this capsule, you will be able to:

8. identify and use the criteria needed for selecting used equipment.

9. identify methods of finding used equipment.

Until now we have been pricing new equipment, but that may <u>not</u> be the best way to buy equipment. In this capsule, we will be working in the realms of want ads, word of mouth, garage sales, and auctions. You will be looking for that "better buy" in used equipment.

The major purpose of this capsule is to show you that new tools are not always the best buy; however, used are not always the best buy either. What Shorty wants you to do is to be aware of the methods of looking for second-hand or used equipment.

# DON'T GET STUNG

As you can see, Shorty is wondering if this used saw is as good as the new saw he selected in activity 7.2. How can he know? Is it just a guess? Will he get "stung"? Will he end up buying a pile of junk? The questions can go on and on, and yet Shorty will not know the answer unitl he buys the tool and uses it for a while. By then it will be too late, because there will be no guarantee. What can he do? How can he protect himself? That answer is what this capsule is all about.

In this capsule we will apply some of the same techniques for selecting used equipment as we used in the first three capsules for buying new equipment. We are going to use Shorty's table saw for our working example.

We will suppose that Shorty saw an ad in the want ad column of his local paper. He goes and looks at the saw. It is very nice looking, very clean with no scratches. It doesn't look like it has been used at all. The man says it works perfectly. Shorty turns on the machine and it runs. The price is 1/3 the cost of the saw he selected in activity 7.2. Should he buy the saw? It looks like a good deal; if he passes it up, someone else might buy it and then Shorty would be out a lot of money... or would he? What should he do?

Let's suppose he goes and looks at the saw and it looks terrible. The paint is scratched and worn off in places, it looks very used. The man says that there are some adjustments that need to be made, but it does run. The price is 1/3 the cost of the new saw Shorty selected in activity 7.2. Should he buy the saw? It doesn't look like a very good deal, maybe he had better pass it up. Shorty would probably waste a lot of money if he buys the saw . . . or would he? What should he do?

What should you do? If you made a decision on the information given, then you would probably make a mistake. What you must do and what Shorty must do is to analyze his purchase just as he did in the first three capsules. Here are some of the most important items that Shorty will need to check when looking at used equipment:

1. Specifications
2. Manufacturer
3. Age
4. Condition

As you remember in activity 5.2 you wrote a list of specifications for each piece of equipment. You can now use that list of specifications to check out the used equipment. If the used equipment has equal or better specifications, then you will know that you are comparing tools of equal value.

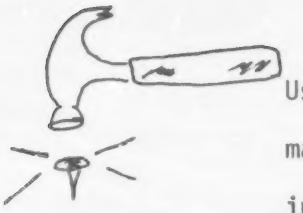
It is important to know if the manufacturer is still in business. If they are still in business, then you will probably be able to buy repair or replacement parts. An example of a poor "good buy" was a drill press that Shorty bought. Everything seemed O.K. but after a while a spring assembly broke and no repair parts were available, because the manufacturer was no longer in business. His "good buy" became a pile of junk.

The third factor to investigate is the age of the equipment. This relates to being able to buy repair parts and to wear that the equipment has had. If a piece of equipment has been used for a number of years, many of the parts may be worn out. The cost of replacing a great number of parts can be more than the cost of a complete new tool, so look closely at the age.

The condition of the tool is a good indication of how well the equipment has been cared for. A good tool if properly cared for will last many, many years. Scratches in paint, minor dents in sheet metal, or worn paint are not necessarily indications of misuse. They are the results of normal use. However, large dents and nicks or rust may be indications of neglect or misuse.

If you keep all of these things in mind as you go shopping for used tools, you will have a better chance of coming up with a true bargain.

Let's review the factors you should check before buying used equipment. Do activity 8.1.



Complete the review sheet "Criteria for Selecting Used Equipment 8.1" found in the shop library. You may use the capsule for your work. Place the sheet in your notebook and then go on to the next section.

Where do you find used tools? How can you "check them out"? Used tools or equipment can come from many sources. The most common are: newspaper want ads, garage sales, auctions and word of mouth. Other sources might be a company that is going out of business, places that are replacing equipment, pawn shops, etc. No matter where you find used equipment, remember the four factors to check before you consider buying. The following activities and the accompaning check list will help you make a decision on whether or not to buy used equipment.

Use the following information to do any of the activities. Before you begin shopping, complete the worksheet entitled "Buying Used Equipment 8.2". Fill in the columns marked "Item" and "Best Price". The "Best Price" figure will be the figure in the column marked "Final Price" from the chart "Cost Comparison 6.2". Also when you go shopping for that used equipment, take your list of specifications (Chart 5.2) with you. By having these two charts you can compare the specifications and the information you will want to know before you buy. See Shorty's chart "Buying Used Equipment" below. As you can see, he has filled out the required information before he went shopping.

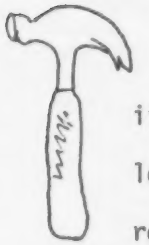
BUYING USED EQUIPMENT 8-2

31

| ITEM | Best Price | Manufacturer & In Business? | good fair poor Condition | Age If Known | yes no Specifications Match | Approximate Items Needing Repairs | Asking Price | Selling Price |
|---|---|---|---|---|---|---|---|---|
| table saw | $239.00 | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

As you are shopping, be willing to bargain. The asking price is not always the selling price. The seller might also be willing to trade, so keep an open mind while you are shopping.

Complete two of the following four activities using the chart "Buying Used Equipment 8.2". Found in the shop library.



9.1

Using the general information given, find one item of your equipment in the want ads section of your local paper. Call and/or check on the information required in the chart "Buying Used Equipment 8.2".

Using the general information given, find one item of your equipment at a garage sale. Fill in the information required in the chart "Buying Used Equipment 8.2".

Using the general information given, find one item of your equipment at an auction. Fill in the information on the chart "Buying Used Equipment 8.2" before the sale begins, then fill in the price at which the equipment sold.

Using any source other than the above three, fill in the information on the chart "Buying Used Equipment 8.2".

At this point, you should have the following items in your notebook:

CAPSULE I

1. The statement of the type of shop you want. (activity 1.2)
2. The list of jobs you want to do. (activity 1.1)
3. The list of all equipment used in your area (activity 2.1)
4. The chart "Equipment Usage". (activity 2.2)
5. Required Shop Equipment (activity 2.3)

CAPSULE II

6. Comparing Total Use-Cost (activity 3.1)
7. Warranties (activity 4.1)
8. Sample Specification Chart (acitivty 5.1)
9. Specifications-Cost (activity 5.2)

CAPSULE III

10. Cost Comparison Chart (activity 6.2)

CAPSULE IV

11. Criteria For Selecting Used Equipment (activity 8.1)
12. Buying Used Equipment (activity 9.1)

# CONGRATULATIONS !

You have completed the capsule series on Selecting and Equipping a Home Workshop. If you use the information you have compiled in your notebook, you will succeed in equipping your shop as you want it, and at the best possible price. You may turn in your notebook for grading.

GOOD LUCK AND GOOD WORK!

Wait a second. . . .

What are you going to do with all that equipment? How do you place it in a shop so that you will have the best usage of material? How much room will you need? If you want to know the answer to these questions, then:

On To Capsule 5 ⇒

Project COST
ESEA Title IV
Kansas State Dept. of Education
USD 449
Easton, KS 66020

# SELECTING and EQUIPPING A HOME WORKSHOP

drafting

general

electrical

woods

metals

sheet metals

auto mechanics

welding

## #5

## PUT IT THERE

Written By:
Richard Sack

## OBJECTIVES

Upon completion of this capsule, you will be able to:

10. identify the areas needed to operate the equipment selected in activity 2.3.

11. incorporate all equipment and operating spaces into a usable work space.

PUT IT THERE

Shorty (and you) have selected and purchased a shop full of equipment. The problem now is how do you put it to the best use?

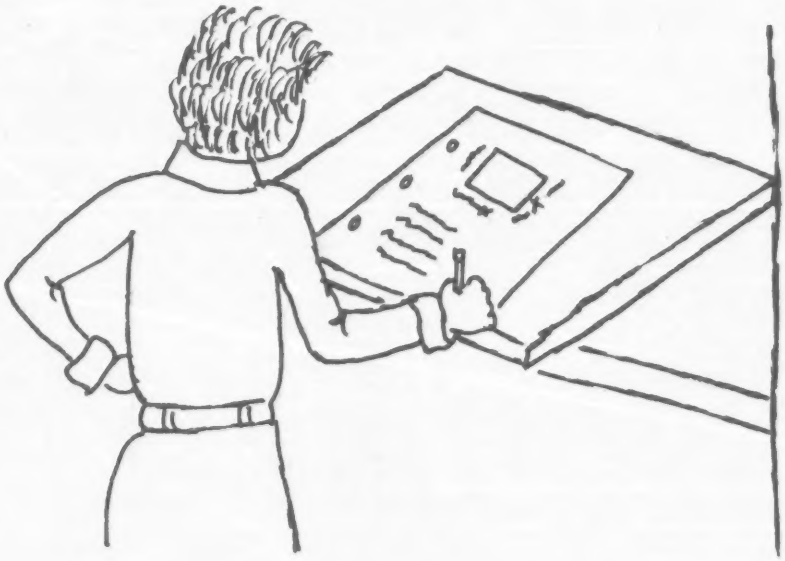
As you can see, Shorty has equipment, but he has a problem with being able to use it properly. Now you will find the physical size requirements for your shop.

Poor Shorty, he has worked himself into a problem. He has room for his saw, but he is finding it a little difficult to cut the board. Here we come to the first objective of this capsule, that is to identify the area needed to operate each piece of equipment you have selected.

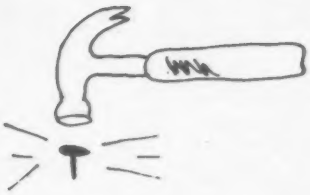
To accomplish this objective you must complete both of the activities on the following pages.

10.1

In this activity, use a separate page for each piece of equipment you have listed from activity 2.3. Sketch the top view of the equipment in the top half of the page. Next put all major outside dimensions on the sketch as Shorty has done in this example.

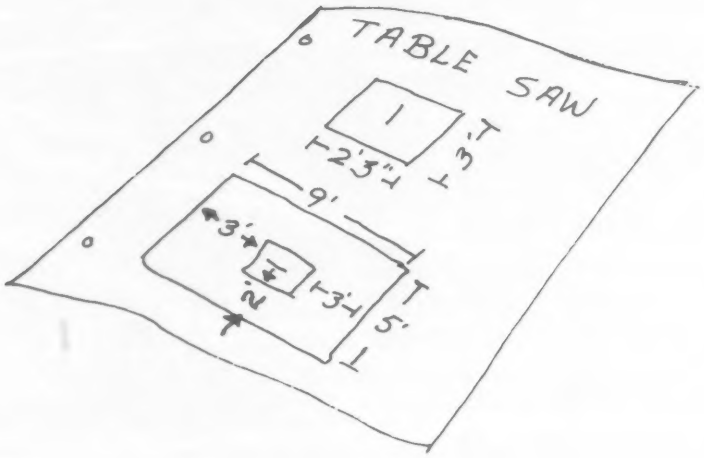


When you have completed this for <u>all</u> equipment, go on to the next activity.



10.2

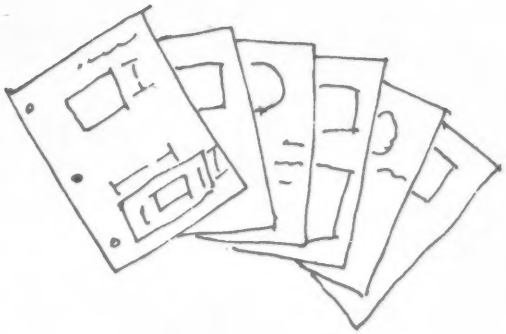
To do this activity you will need to go into the shop area, after checking with the teacher, and operate each piece of equipment. What ever machine you operate be sure to use the biggest piece of material you would ever use (cut, shape, etc). After operating the equipment, measure the <u>total</u> area you needed. Be sure to include the equipment itself in this measurement. Then on the bottom half of the paper you started in activity 10.1, sketch this area with the placement of the equipment in that space. See Shorty's sketch below.

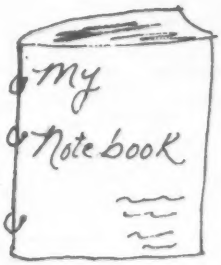


-REMEMBER-

Include the material you are working with in the total area. Also do each sheet and tool one at a time.

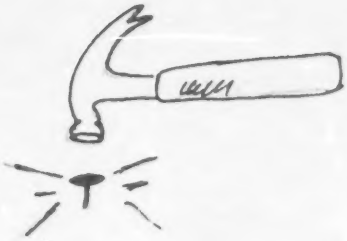
Place these sheets in your notebook.





Now that you have completed your sketches, you will put this information together to form a shop plan. Here we come to the next objective; that is to incorporate all the equipment and operating spaces that you found in activity 10.2 into a smaller total use space.

To accomplish this, you may now go to the next activities.

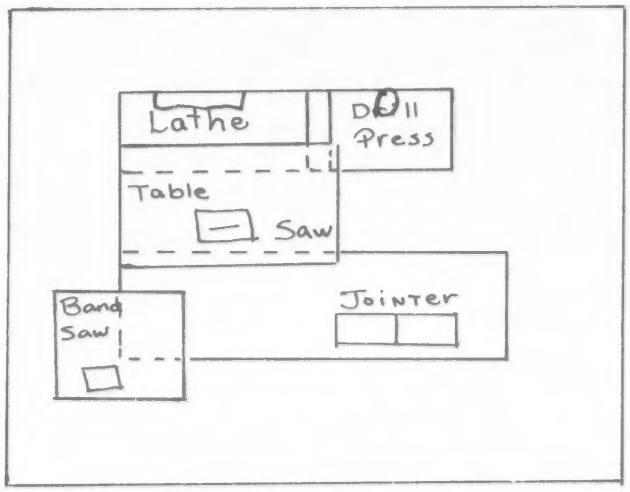


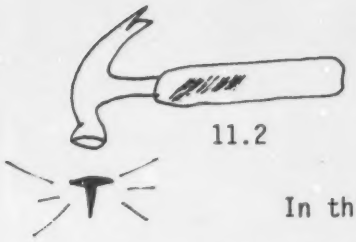
11.1

Using a scale of 1" = 1', draw each piece of equipment and its working space (activity 10.2) on a piece of heavy drawing paper and cut it out. Then on a drawing board, layout the pieces so that you use the smallest total amount of space. See Shorty's sample below.

-REMEMBER-

Some equipment use space may overlap. When you have completed this, have it checked by the instructor. With your instructor's okay, you may go on to the next activity.





11.2

In this activity transfer the total shop space found in activity 11.1 to a piece of drawing paper. Use a scale of ¼" = 1'. Include the equipment placement in the space. Put this page in your notebook and place the other materials (cutouts, etc.) in the envelope at the back of the notebook.

You now have a floor plan of your shop to go along with your list of equipment and costs.

Shorty wants to congratulate you on your hard work. If you use this information and techniques, you will have a great workshop at the lowest possible cost!

GOOD LUCK!!

At this point, you should have the following items in your notebook:

CAPSULE I

1. The statement of the type of shop you want. (activity 1.2)
2. The list of jobs you want to do. (activity 1.1)
3. The list of all equipment used in your area. (activity 2.1)
4. The chart "Equipment Usage". (activity 2.2)
5. Required Shop Equipment (activity 2.3)

CAPSULE II

6. Comparing Total Use-Cost (activity 3.1)
7. Warranties (activity 4.1)
8. Sample Specification Chart (activity 5.1)
9. Specification-Cost (activity 5.2)

CAPSULE III

10. Cost Comparison Chart (activity 6.2)

CAPSULE IV

11. Criteria For Selecting Used Equipment (activity 8.1)
12. Buying Used Equipment (activity 9.1)

CAPSULE V

13. Worksheets on equipment and area (activity 10.2)
14. Floor plan (activity 11.2)
15. Envelope (activity 11.1)

Now that you have completed all capsules you should review everything you have done and when you are ready, take the Post-Test.

GOOD LUCK!